

climate change initiative

## → CLIMATE MODELLING USER GROUP

# WP3: Quality assessment of CCI products



*Pablo Ortega*  
*Earth Sciences Department (BSC)*

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# WP3.4 Propagation of CCI(+) observational uncertainties to climate model scales

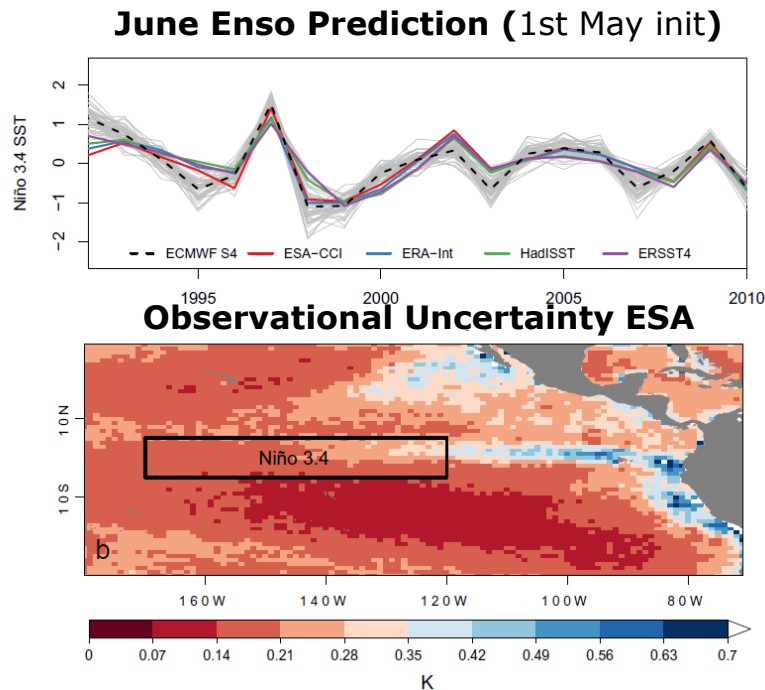


## Background and rationale:

Uncertainties in climate models and observational references have been assessed thoroughly in the past. However, it has remained difficult to integrate these because of the lack of formal concepts that characterize uncertainties at common scales to both models and observations.

A first framework to perform this was developed in CMUG-CCI for SSTs.

*Bellprat et al, 2018*



People involved: Louis-Philippe Caron  
Etienne Tourigny



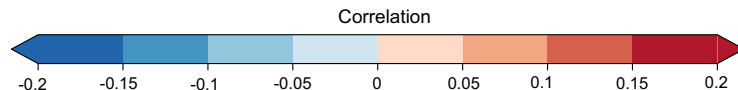
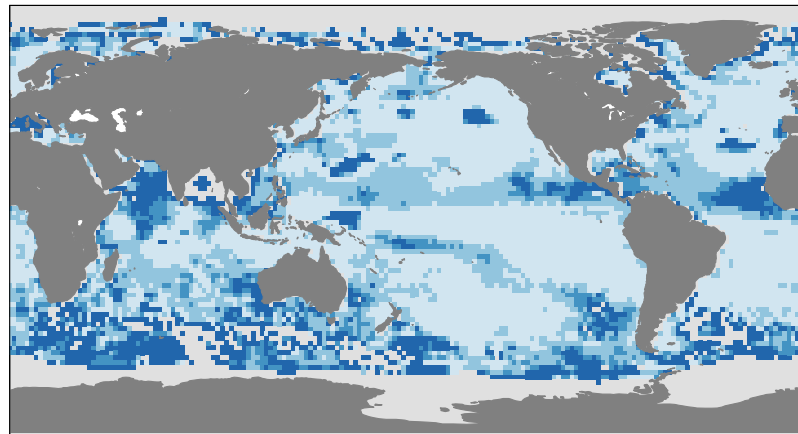
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*Bellprat et al, 2018*

## Lost skill due to total observational uncertainty



People involved: Louis-Philippe Caron  
Etienne Tourigny





# WP3.4 Propagation of CCI(+) observational uncertainties to climate model scales



## Plans to work with CCI+-ECVs:

Expand to other ECVs relevant to study wild fires:

- Old ECVs: **fire** (burned area), soil moisture
- New ECVs: land surface temperature

## Interaction with relevant teams:

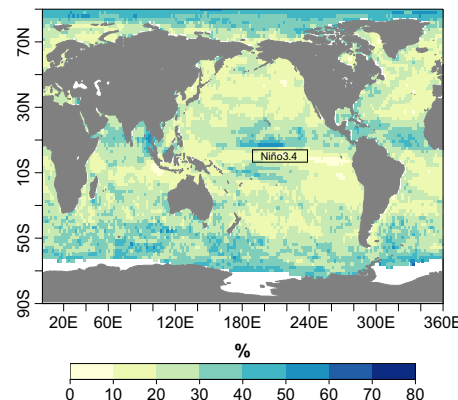
- Attendance to next Fire CCI meeting
- Emilio Chuvieco collaborator of Etienne's MSCA on wild fires
- Participation to Meetings/regular telcos

## Consistency between ECVs:

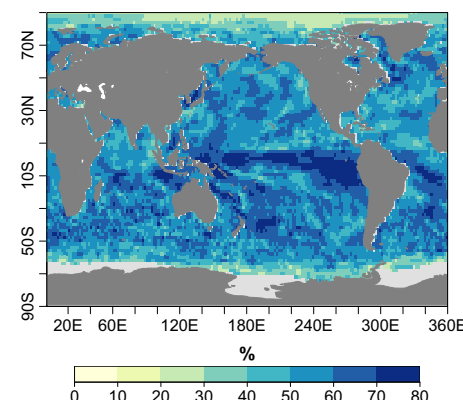
- New metric to assess consistency across at least 4 variables (SST, fire, soil moisture, LST)
- Compare in each the importance of record length vs observational uncertainty

*Bellprat et al, 2018*

### Observational Uncertainty



### Record Length Uncertainty







## Use of uncertainties:

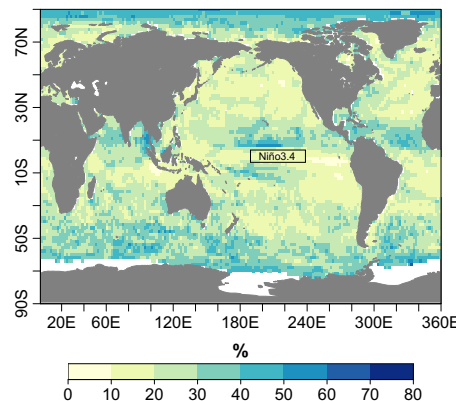
- The observational error is required to compute the interpolation errors in space/time (which need a finite correlation length and correlation time scale)
- For case studies on prediction, we will quantify two additional sources of uncertainty, due to the record length and to the ensemble size.

## Mechanisms to provide feedback to ECV teams

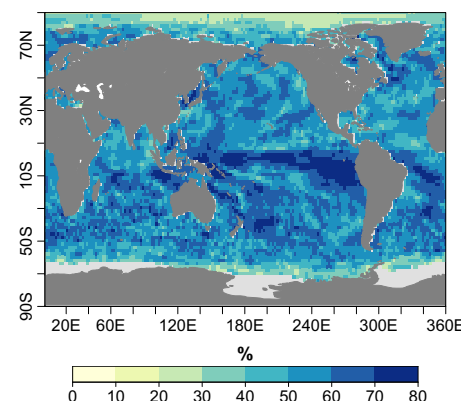
- Regular channels: (e.g. Participation to Meetings/telcos)

*Bellprat et al, 2018*

### Observational Uncertainty



### Record Length Uncertainty





# WP3.7 Evaluation of the impact on skill of an enhanced SIR on seasonal prediction

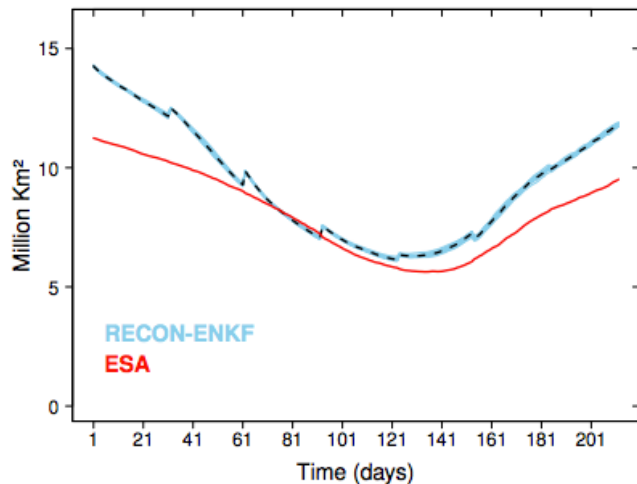


## Background and rationale:

The analysis of a previous reconstruction of sea-ice performed within the CMUG-CCI has highlighted that the accuracy of assimilation can be limited by the uncertainty of the assimilated products, and also by the frequency of each assimilation phase.

*Cruz-García et al, In Prep.*

## Pan-Arctic Sea Ice Extent May through October



People involved: Pablo Ortega  
Juan Acosta  
Rubén Cruz-García



# WP3.7 Evaluation of the impact on skill of an enhanced SIR on seasonal prediction



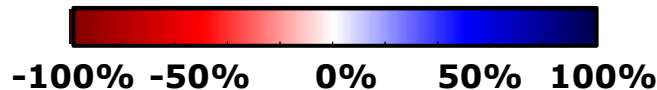
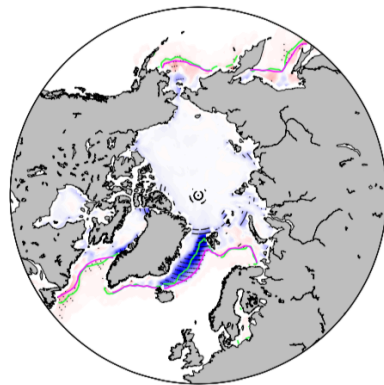
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People involved: Pablo Ortega  
Juan Acosta  
Rubén Cruz-García

*Cruz-García et al, In Prep.*

## Sea Ice Concentration Difference Recon-ENKF vs ESA (1st May)







# WP3.7 Evaluation of the impact on skill of an enhanced SIR on seasonal prediction



*García-Serrano et al, 2014.*

## Plans to work with CCI+-ECVs:

- Directly assimilated: **SIC**
- Nudged: SST (to be considered)
- Analyses: SIT, clouds and potentially salinity

## Interaction with relevant teams:

- Regular channels: (e.g. Participation to Meetings/telcos)

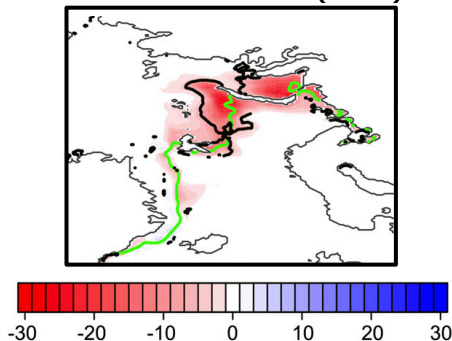
## Consistency between ECVs:

- Forecast evaluation against other CCI products (such as SST, SIT and Clouds)
- Testing if skill is improved when CCI SIC/SST data is included in the ICs.

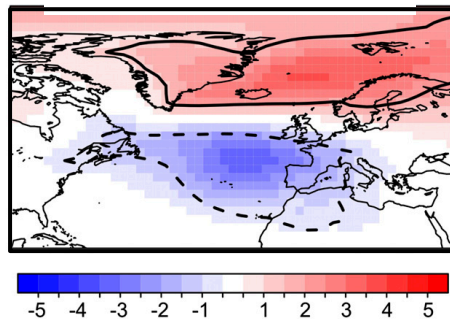
## Expected outcomes:

Improved skill over the Arctic and beyond

1st EOF of November  
Sea Ice Cover (SIC)



Predicted DJF  
Sea Level Pressure





# WP3.7 Evaluation of the impact on skill of an enhanced SIR on seasonal prediction



*García-Serrano et al, 2014.*

## Use of uncertainties:

- The observational error is required to compute the interpolation errors in space/time (which need a finite correlation length and correlation time scale)
- Uncertainty will be addressed in the forecast evaluation by comparing with other observational products available

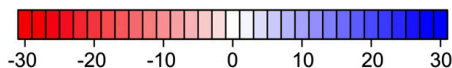
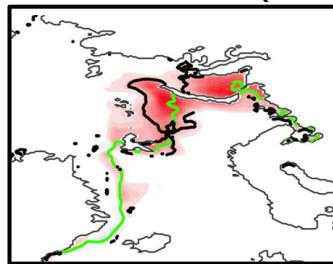
## Mechanisms to provide feedback to ECV teams

- Regular channels: (e.g. Participation to Meetings/telcos)

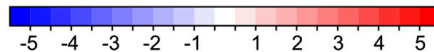
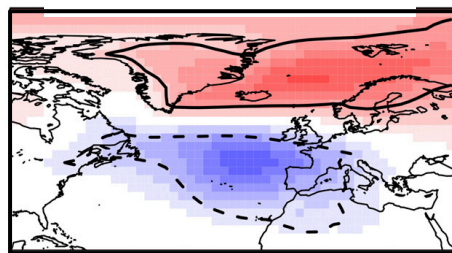
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1st EOF of November  
Sea Ice Cover (SIC)



Predicted DJF  
Sea Level Pressure



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# WP4: Exploiting CCI products in MIP experiments



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# WP4.7 Evaluation of probabilistic and deterministic skill in decadal predictions



## Background and rationale:

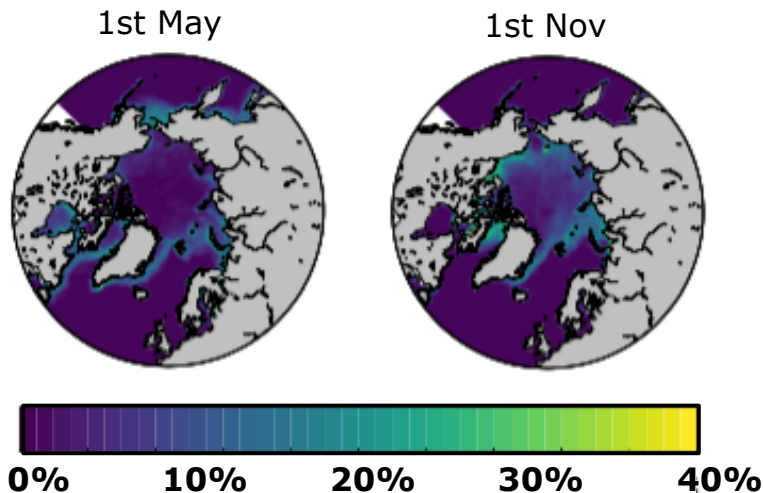
A rigorous assessment of prediction skill requires climate predictions to be evaluated against different observational datasets, preferably independent from those used for initialization.

This is important to reflect the observational uncertainty, and the degree of coherence among the different products.

People involved: Louis-Philippe Caron  
Simon Wild

*Cruz-García et al, In Prep.*

## Uncertainty in NSIDC Sea Ice Concentration Products





# WP4.7 Evaluation of probabilistic and deterministic skill in decadal predictions



## Background and rationale:

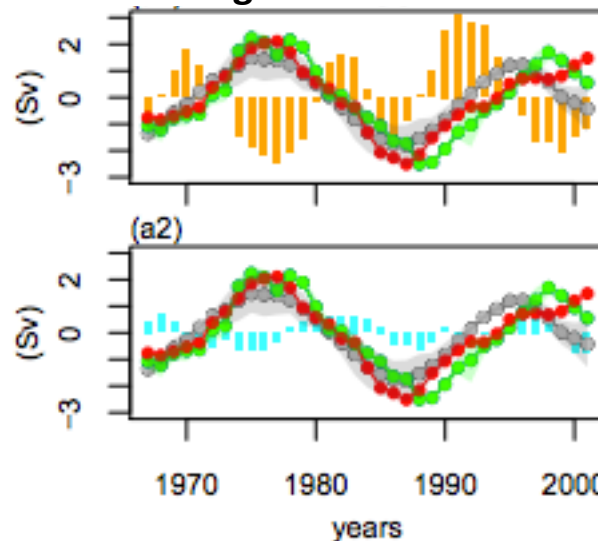
*Mignot et al 2016*

A rigorous assessment of prediction skill requires climate predictions to be evaluated against different observational datasets, preferably independent from those used for initialization.

This is important to reflect the observational uncertainty, and the degree of coherence among the different products.

People involved: Louis-Philippe Caron  
Simon Wild

Decadal predictions of AMOC  
Strength in IPSL-CM5A-LR



ORAS4

SODA2.4



# WP4.7 Evaluation of probabilistic and deterministic skill in decadal predictions



## Plans to work with CCI+-ECVs:

Multi-model extensive skill assessment of the DCPD predictions against longest CCI products

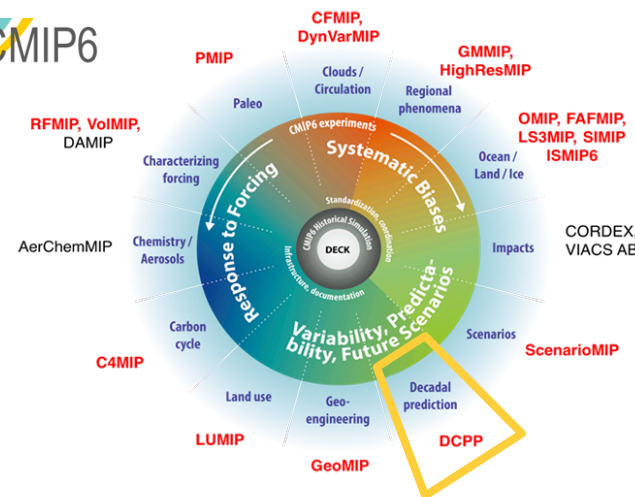
- CCI ECVs: Sea Level, SST and Clouds
- Other products more than 20 year long?

## Interaction with relevant teams:

- Regular channels: (e.g. Participation to Meetings/telcos)

## Consistency between ECVs:

- Focus on regions and indices for which skill is expected to be consistent for the selected variables (e.g. tropical areas, ENSO)
- CCI products as independent validation source to test consistency with initialization datasets



## DCPD Component A:

Retrospective Predictions [1960-2017]

## DCPD Component B:

Near-real time Forecasts [2018 onwards]





# WP4.7 Evaluation of probabilistic and deterministic skill in decadal predictions

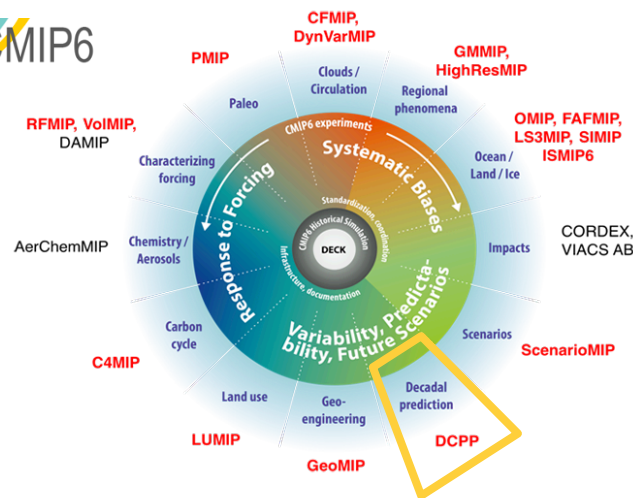


## Use of uncertainties:

- Uncertainties in the predictions will be illustrated through the use of probabilistic skill metrics, and by evaluating them against different reference datasets

## Mechanisms to provide feedback to ECV teams

- Regular channels: (e.g. Participation to Meetings/telcos)



## DCPP Component A:

Retrospective Predictions [1960-2017]

## DCPP Component B:

Near-real time Forecasts [2018 onwards]